

## SOLAR OBSERVATIONS.

## SOLAR AND SKY RADIATION MEASUREMENTS DURING FEBRUARY, 1921.

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[Solar Radiation Investigations Section, Washington, Mar. 31, 1921.]

For a description of instruments and exposures and an account of the methods of obtaining and reducing the measurements, the reader is referred to this REVIEW for April, 1920, 48:225.

From Table 1 it is seen that the solar radiation intensities measured very close to normal values for February at all the stations.

Table 2 shows a deficiency in the radiation received from the sun and sky at Washington and Madison, and also at Lincoln during the early part of the month, followed by an excess during the latter part.

Skylight polarization measurements obtained on four days at Madison when the ground was free from snow give a mean of 65 per cent and a maximum of 73 per cent on the 18th. There was practically no snow on the ground during the month at Washington, and skylight polarization measurements obtained on two days give 64 per cent for both the mean and the maximum values. The above are average values for February at both stations.

TABLE 1.—Solar radiation intensities during February, 1921.

[Gram-calories per minute per square centimeter of normal surface.]

## Washington, D. C.

Date.	Sun's zenith distance.											
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon.	
	75th me- ridian time.	Air mass.										Local mean solar time.
		A. M.					P. M.					
		e.	5.0	4.0	3.0	2.0	1.0	2.0	3.0	4.0	5.0	
Feb. 12.....	mm.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mm.	
14.....	2.74	.....	0.79	.....	.....	.....	1.08	.....	.....	.....	3.30	
15.....	4.37	.....	.....	.....	.....	.....	1.08	1.23	1.03	0.95	5.36	
16.....	2.62	0.93	1.03	1.15	1.28	1.43	1.23	1.03	0.95	0.84	2.74	
Means.....	4.57	0.62	0.76	0.94	1.18	1.41	1.06	0.80	0.60	0.45	6.02	
Departures.....	(0.78)	0.86	(1.04)	(1.22)	.....	.....	1.12	(0.92)	(0.78)	(0.64)	.....	
	+0.00	+0.02	+0.03	+0.01	.....	.....	-0.09	-0.09	-0.07	-0.12	.....	

## Madison, Wis.

Feb. 15.....	4.17						1.00	0.75				8.81
16.....	5.56					1.35						3.00
18.....	1.52				1.26		1.38	1.22				2.36
19.....	1.45						1.40	1.28				1.52
23.....	1.60					1.39	1.40	1.27				2.06
Means.....					(1.26)	(1.37)	1.30	1.13				
Departures.....					+0.02	-0.01	-0.09	-0.07				

## Lincoln, Nebr.

Feb. 9.....	2.62				1.29							3.81
11.....	3.81					1.53	1.43	1.29	1.16	1.05		5.56
15.....	6.27			1.05	1.18	1.33	1.50					7.57
16.....	3.63				1.19	1.35						3.15
17.....	2.06	0.97		1.08	1.22	1.43		1.34				2.49
18.....	2.36			1.07	1.19							2.87
22.....	5.36						1.40	1.22	1.11	0.99		3.45
23.....	2.62											3.15
25.....	3.45					1.18						5.36
Means.....		(0.97)	(1.07)		1.19	1.36		1.39	(1.26)	(1.14)	(1.02)	
Departures.....		-0.06	-0.01	-0.04	-0.05		+0.04	+0.06	+0.10	+0.11		

## Santa Fe, N. Mex.

Feb. 8.....	2.26				1.50							2.74
10.....	1.88					1.53						2.49
12.....	3.45				1.51	1.68	1.49		1.23	1.16		4.37
14.....	2.87				1.34			1.36	1.24	1.15		3.45
16.....	1.96				1.43		1.71	1.57	1.36	1.30	1.23	1.68
24.....	2.74				1.32	1.44		1.41	1.27	1.19	1.11	3.45
26.....	3.30				1.32	1.44	1.67	1.48	1.36	1.25	1.17	3.99
Means.....				(1.18)	1.35	1.48		1.49	1.34	1.24	1.16	
Departures.....				-0.04	+0.03	+0.01		+0.05	+0.03	+0.03	+0.03	

1 Extrapolated.

TABLE 2.—Solar and sky radiation received on a horizontal surface.

Week beginning.	Average daily radiation.			Average daily departure for the week.			Excess or deficiency since first of year.		
	Washington.	Madison.	Lincoln.	Washington.	Madison.	Lincoln.	Washington.	Madison.	Lincoln.
Jan. 29.....	cal. 194	cal. 123	cal. 185	cal. -14	cal. -80	cal. -60	cal. +19	cal. -1,193	cal. -1,411
Feb. 5.....	150	130	214	-77	-90	-52	-519	-1,822	-1,777
12.....	311	257	380	-61	+15	+67	-89	-1,715	-1,806
19.....	224	231	354	-46	-30	+28	-409	-1,923	-1,194

1 For four days only.

## MEASUREMENTS OF THE SOLAR CONSTANT OF RADIATION AT CALAMA, CHILE.

By C. G. ABBOT, Assistant Secretary.

[Smithsonian Institution, Washington, Apr. 1, 1921.]

In continuation of preceding publications, I give in the following table the results obtained at Montezuma, near Calama, Chile, in January, 1921, for the solar constant of radiation. The reader is referred to this REVIEW for February, August, and September, 1919, for statements of the arrangement and meaning of the table.

The month of January was very cloudy. Late reports indicate that February was even more so.

Date.	Solar constant.	Method.	Grade	Transmission coefficient at 0.5 micron.	Humidity.			Remarks.
					$\rho/p$ s.c.	V. P.	Rel. Hum.	
1921.								
A. M.								
Jan. 4	cal. 1.963 1.972 1.968	M <sub>1.20</sub> M <sub>1.18</sub> W. M.	S—	0.862	0.658	cm. 0.44	Per cent. 20	Cirri in various parts of sky prevented earlier observations.
5	1.957 1.967 1.964	M <sub>2.5</sub> M <sub>1.5</sub> W. M.	S—	.862	.571	.39	29	Scattered cirri in north and east.
6	1.933 1.929 1.933	M <sub>1.5</sub> M <sub>1.00</sub> M <sub>1.00</sub>	S	.860	.690	.37	15	Scattered cirri prevented earlier observations.
7	1.931 1.954 1.954	W. M. M <sub>2.5</sub> W. M.	S	.862	.570	.42	36	Patches of cirri around sun prevented earlier observations.
8	1.959 1.951 1.954	M <sub>2.5</sub> M <sub>2.5</sub> W. M.	S	.857	.534	.48	45	Streaks of cirrus low in east.
P. M.								
10	1.968	M <sub>1.30</sub>	S	.859	.678	.42	17	Clouds prevented further observations.
A. M.								
14	1.964	M <sub>1.04</sub>	S—	.857	.556	.83	34	Clouds prevented further observations.
15	1.961 1.965 1.962	M <sub>1.07</sub> M <sub>1.04</sub> W. M.	S	.854	.605	.56	23	Cirri over northern and eastern horizon preventing earlier observations.
18	1.932	E <sub>2</sub>	VG	.846	.367	.57	58	Clouds over high peaks in north and east.